Dovetail Energy Operation and Maintenance (O&M) Plan

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CHAPTER I: INTRODUCTION

General description of manual purpose, organization, and use.

CHAPTER II: OPERATION AND CONTROL OF WASTEWATER TREATMENT

a. Process Parameters and Monitoring Methods:

Process parameters are monitored on a 24/7 basis, a variety of functions are measured, monitored and reported on daily. Pumps, valves, sensors, and grinders are all equipped with an Ethernet connection allowing our PLC to show us what is currently open, closed, or currently operating.

1) The fill levels in both tanks form an overall delta. This delta states that if the combination fill levels between the two tanks deviates by more than 7,000 gallons, an alarm would be raised; feeding would cease, and the proper valves would automatically be closed to prevent any spillage. These readings are taken by a pressure sensor which extends into the tank. Temperatures within our tanks is monitored and automatically regulated by our system. We give our PLC a setpoint at which to maintain the tanks at. This can be manually checked at opposing ends of the heat exchanger and on the inlet and outlet sides there is a gauge mounted. In addition, there is another sensor that is directly mounted onto the tank and extends 1' into the tank, which the PLC takes its reading from. Energy production at each facility can vary and is directly related to the quality of the feedstock received.

2) Within our system we can view a line graph that is constantly updated which directly relates to the gas being held in our inner membrane of the digester. The quality of this gas is sampled every 8 minutes through a gas analyzer which samples it for CH_4, CO_2, O_2 and H_2S. If we were to ever produce more gas than our engine could use to produce electricity it would first be burned off within our flare system. This flare system can be controlled manually or automatically within our PLC. If the flare were to ever fault and not begin to burn off the excess gas, this gas would then be vented through our emergency over/under pressure valve. Operating conditions of various pumps and valves are also monitored and recorded upon daily.

3) A reading is taken on both sides (suction, discharge) of any pump measuring the pressure being created. Ductile cast iron and schedule 80 PVC is used underground for process piping. These readings are taken to ensure we don't exceed the manufacturer specs. Daily recordings are taken of the hertz that the pumps run at as they carry out various functions within the system.

4) Daily monitoring activities are to be recorded electronically using Smartsheet and hard copies will be filed on-site for a minimum of 5 years.

5) Various activities are monitored around the clock; our PLC system itself is also set up with alarms which are sent to various quasar engineers. In conjunction with having an operator on-site on an average business day from 6am - 4pm, we also have monitoring stations set up in our Wooster, Ohio, Engineering & Monitoring Office. In the off-hours when nobody is physically on-site or in the office, we have remote access to all of our plants via smart phones and tablets. Anything that an operator can view from the screens within the plant can also be accessed by these devices. Plants are set up to send an alarm to several employees detailing what occurred, the time, and the date. We have alarms to monitor everything that we can physically view on our PLC screen; each with varying alarm levels.

b. SPECIFIC MONITORING OF VARIOUS COMPONENTS:

1. The digester tank-

- The tank reaches a height of 39.4' with a diameter of 59.4'.
- Capacities for the digester are as follows - 812,532 gallons overall capacity; an operating volume of no more than 750,300 gallons is maintained.
- Wet volume calculates out to be roughly 20,750 gallons per foot of tank height.

Visual inspections are made at a minimum of twice daily, checking not only into the tank, but also for leaking at the various seals and pipe penetrations. In the winter months it becomes a necessity for us to regularly check all manual valves going into tanks as they can freeze if improperly maintained. The double membrane roof that collects the various gases as they are formed is made of a polyester architectural material. The outer membrane is rated for 4" of pressure within the tank. This system itself is generally maintained by the CHP and flare, with the over/under pressure valve being the failsafe.

2. The biomass tank-

- The tank reaches a height of 45' with a diameter of 29.71'.
- Capacities for the biomass tank are 232,589 gallons of overall capacity; a working volume not to exceed 217,031 gallons.

The biomass and digester tanks have a gas line that runs between the two that serves two functions: to equalize pressure between the two tanks and avoid creating vacuum and to allow gases created within the feedstock tank to be captured in the dome of the digester.

These tanks are sealed air-tight, and constructed with ½" steel coating on the inside to prevent corrosion from the variety of materials accepted within our facilities.

3. The liquid receiving pit-

- The liquid receiving pit is a sealed container with a width of 16.3' and a height of 13'.
- The holding capacity is 12,000 gallons and a max operational height of 11.6'.

The blower for the biofilter ties into the piping from this pit and is used to suction various gases through the system. This receiving pit is covered by two manholes with small covers to be removed as various loads are received throughout the day. Before entering this confined space an air monitor is lowered into the pit to monitor for hazardous fumes, and the pit it so be ventilated for no less than two hours regardless of the air monitor results. Ventilation for confined space is not only limited to the use of the biofilter, but also a smaller portable blower is installed to help improve air circulation.

The solids receiving area houses the open hopper pump, the husky pump we use to load trucks, and one of three recirculation pumps within the facility. The various pumps and piping configured in this confined space can each be isolated using manual valves allowing the area to remain air tight as to keep harmful gases from being emitted.

Biofilter is a 30'x30'x6' design, medium will be covered in mulch and raked and watered weekly as to maintain proper function. Captured emissions then undergo aerobic biodegradation to remove pollutants and odor. Activated carbon is used to a backup to this system. Temperatures inside biofilter are monitored using a 4' temperature probe, once a week. Monitoring for H_2S concentrations at inlet to biofilter shall be installed as per requirements.

Flare will have a flow meter installed and records will be kept to monitor the amount of biogas burned and the length of time. Temperatures of the flare will be monitored using a handheld device while in operation.

Engine record keeping for both maintenance plans and performance will both be filed online. Records will be kept for a minimum of 5 years in paper form and electronically. Emissions from the engine will be stack tested and analyzed using the AERSCREEN/AERMOD model to monitor compliance with permits.

c. POTENTIAL PROCESS UPSETS/FAILURE AND CORRECTIVE ACTIONS TAKEN:

Anaerobic digesters are prone to incidents of foaming; generally what we experience with it is when we take an excessive amount of FOG or other high strength feedstocks. If left unchecked it can be catastrophic to our system; which is why we require such

attention to detail in our daily digester observations. Our first method in an attempt to control any foaming issue is an adjustment in our feeding rate. If a reduction in the foam layer is not visible within the first two or three hours other measures become necessary. Removal of the foam through either a standpipe or recirculation pump becomes our secondary method of control. This allows the bacteria more time to process the material; this material would otherwise form an acidic layer just beneath the foam. If an acidic layer has been formed within the tank this becomes our best method of control. The need for ceasing feeding is a very rare occasion used only when all other methods have failed.

Biology upset which shows a decline in overall performance of a digester; requiring a reseed in the digester. Effluent which is ideal for gas production will then be trucked in from one of our facilities to begin the process again.

Recirculation of active sludge back into the feedstock can cause a tremendous amount of $C0_2$ production. On very rare occasions it is necessary for us to recycle our active sludge back into our biomass tank to be used as feedstock in order to continue gas production. Anytime this is done activity within the tank must be closely monitored for foaming; this will require an operator to be on top of the tank with the manhole open watching the sludge being fed into the tank.

Bypassing safety functions for an abnormal operation. Seldom do our operators need to complete a task that our system has not been configured to handle but it does happen. Normal safety functions cannot be bypassed by any operator, requiring an engineer to override the safety function. More often than not our only concern with overriding safety functions is maintaining equal pressure between the tanks. Safety checklists are followed before any abnormal or remote operations are conducted.

d. COMMISSIONING PROCEDURES:

Seed sludge:

- fill the digester approx. 50% with seed sludge, 300,000 to 400,000 gallons, the fill volume is depending on the sludge availability
- operate all the side entry mixers that are covered with 3 feet of sludge
- heat the sludge to 100°F, do not increase the temperature more than 1°F a day
- when the temperature is at 100°F start dosing feedstock

Feedstock dosing and biology monitoring:

- start dosing at a COD load of 2.0 kg COD/m^3day
- the COD load is based on sludge volume, COD of feedstock and daily dosing volume, kg COD/m^3day

- measure the VFA/TIC ratio once a day
- if the VFA/TIC ratio is below 0.5 increase the daily dosing by 0.5 kg COD/m³day every other day
- do not exceed 7.0 kg COD/m³day
- if the VFA/TIC ratio is below 0.5 remain a dosing rate of 7.0 kg COD/m³day
- please find dosing calculator attached

Biogas production:

- measure gas quality once a day
- keep the gas storage room sealed
- when the gas storage volume reaches 100 % vent the gas volume down to 0 %
- that allows to pass the explosion zone as soon as possible
- the explosion zone is between a gas quality of 5% and 15% oxygen
- when the gas quality exceeds 45% methane use the flare to pull down the membrane
- start the CHP when
    - the gas quality exceeds 50% methane
    - the gas volume production allows a CHP operation at 50% power and a runtime of 12 hours a day

e. BIOFILTER MANAGEMENT:

ODOR MANAGEMENT GOALS:

1. Engineer the size and characteristics of biofilter(s) to the projected flows on a per plant basis.
2. Reduce odors from receiving pit(s) to an inoffensive level leaving the sites.
3. Use specified biofilter media and maintain the media for effective controls.

BIOFILTER MEDIA SPECIFICATIONS:

Biofilter Media Specification: Screen composted yardwaste overs through a 2" screen. The resulting mixture will contain a mixture of coarse yardwaste > 2" and some yardwaste fines. Large pieces are needed to provide structure and fine material is needed to support the odor consuming microorganisms.

When changing out media approximately 20% of the new media should be old media for jump starting the biofilter biology. Spent media can be used as mulch or soil additive without restrictions.

BIOFILTER SIZING CALCULATIONS:

Review and size inflow air volume to biofilter(s) based on attached design spec calculations. Note the daily changes in the inflows are driven by the daily inflows that concentrate 2/3 of the inflow into 4 hours each morning (or other depending on site specifics).

If sources other than receiving pits are going to be sent to the biofilters then we will need to plumb it so some of receiving pit air which contains outside air is mixed with anaerobic air flows from other sources. Biofilters work aerobically.

BIOFILTER INFLOW MANAGEMENT:

As feedstock loads are received the solids pit will be opened for receipt of solids and closed as soon as possible to minimize air volume going to the biofilter and release of odors. Liquid receiving pits will be opened at receipt of liquids and closed as soon as possible after completion.

CHAPTER III: OPERATION AND CONTROL OF SLUDGE HANDLING

DOVETAIL ENERGY, LLC.

ANAEROBIC DIGESTION FACILITY

SLUDGE MANAGEMENT PLAN

AUGUST 2013

I. GENERAL INFORMATION

A. NAME, ADDRESS, AND PHONE NUMBER

1. Dovetail Energy, LLC
   7624 Riverview Road
   Cleveland, Ohio 44141
   Bruce Bailey
   Project Manager
   216.986.9999 ext. 116

   Facility Location
   1146 Herr Road
   Fairborn, Ohio 45324

II. SOLIDS INFORMATION

This anaerobic digestion facility (ADF) is a merchant facility and will accept and process biosolids (sewage sludge), manure, foodwastes, FOG (fats, oil, & grease), energy crops, i.e., corn silage, and other organic feedstocks.

Feedstock is accepted to the digester in liquid and solids forms. Solids go to the receiving pit which opens to accept up to a semi-load of material at a time. Liquids are accepted into two 12,000 gallons underground receiving tanks. Liquids are directed to the Receiving Pit as necessary to form pumpable slurry. The pumpable slurry and liquids are pumped to the Feedstock Receiving Tank. The Digester is fed regularly from the Feedstock receiving Tank.

Feedstock is sampled as received and sampled for COD, pH, and ORP. We have established a laboratory SAP. The SAP covers incoming feedstock, operational sampling and analysis, and effluent testing and analysis per 40 CFR 503 and OAC 3745-40.

A. MANURE

A number of farms and/or livestock based events in the regional produce manures which may be directed to this facility. Due to the organic basis of manure it will contain volatile solids and anaerobic digestion will convert the volatile solids to biogas while stabilizing the manure.

B. FOODWASTE

Food processors in the region produce foodwastes which may be directed to this facility. Foodwaste will be accepted in liquid, semi-solids, and solid forms. Due to the organic basis of foodwaste it will contain volatile solids and anaerobic digestion will convert the volatile solids to biogas while stabilizing the foodwaste.

C. FOG

FOG represents a particular challenge to collection system operators in municipalities. As such a number have restricted acceptance of FOG. This facility will accept FOG because it produces a large volume of biogas when anaerobically digested and is difficult to dispose of through other methods.

D. ENERGY CROPS

Energy crops are grown for anaerobic digestion to produce biogas as a standard practice Europe. We anticipate that such a practice will occur within the expected lifetime of this ADF. Production of Energy Crops with a return of the digested product to farm fields forms a closed loop for beneficial use and the production of renewable green

energy. Also included in this category is off-spec or damage agricultural products such as grain, hay, silage, spilled/soiled feed, stover, etc.

E. GLYCERIN, STILLAGE, & OTHER BIOGAS PRODUCING BY-PRODUCTS

Bio-Based fuels are quickly gaining a foothold in the US. In the case of biodiesel glycerin is a by-product. There is a market for a certain volume of this by-product in the cosmetics industry. As more and more biodiesel is produced a market glut occurs. In the western US it is already standard practice to add glycerin to boost biogas production. Glycerin is an excellent source of biogas when anaerobically digested.

Ethanol is the distillation of alcohol from grain. In the US ethanol is primarily produced from corn (*Zea mays*). Alcohol is produced from the starchy endocarp and the remaining distillers' grain (known as stillage) is usually dried to become DDGS (Distillers' Dried Grain with Solubles). As with glycerin, there is a finite market for DDGS. Stillage, the wet, as produced, form of ethanol by-products is an excellent source of biogas when anaerobically digested.

Organic, high energy materials such as glycerin and stillage will be accepted for anaerobic digestion at this facility.

F. OEPA APPROVED FEEDSTOCKS

The OEPA/DSW has approved other feedstocks for surfactant or biogas production in separate actions.

G. SOLIDS MANAGEMENT

1. TANKAGE

The initial facility consists of a 750,000 gallon complete mix anaerobic digester and a 230,000 gallon feedstock receiving tank. Based on the designed inflow of up to 5,000 DT/year this volume of digester tankage will result in a 20 to 30 day hydraulic retention time. The 230,000 gallon mixing/contact basin (feedstock receiving tank) for homogenization of cake sludge to acceptable percent solids for introduction into the digesters.

2. PATHOGEN REDUCTION, VAR, AND METALS

The ADF is designed to operate at either a mesophillic (95 to 100^{0}F) or thermophilic ranges (>122 to 172.4^{0}F for 22 days to 3 minutes temperature dependent. See OAC 3745-40-04-08- Table B2)

- When operated at mesophillic range the digested biosolids for direct land application purposes will meet PSRP Class B pathogen control and VAR through

anaerobic digestion with a minimum volatile solids reduction of 38%. Class B pathogen reduction will be confirmed and must be <2,000,000 fecal coliform MPN/gram, geometric mean of seven samples.

- When operated at thermophilic range the digested biosolids for off-site sale will meet PFRP Class A pathogen control, VAR through anaerobic digestion with a minimum volatile solids reduction of 38%, and metals will be at or below OAC 3745-40-02 Table B2. Class A pathogen reduction will be confirmed and must be <1,000 fecal coliform MPN/gram for seven samples.
- The plan is to operate primarily as a Class B ADF going to agricultural OEPA approved land applications sites.

3. CLASSIFICATION OF SOLIDS

When land application of liquid biosolids is selected, the material will be Class B anaerobically digested. When Class A EQ product is produced through thermal treatment the product will be distributed in primarily SWDO counties.

If for any reason any one of these parameters is not met in the ADS process the effected material will be recycled back through the process until such material meets all the Class A or B requirements. If the material still fails to obtain the requirements it will be considered for disposal in the landfill.

III. TREATMENT ALTERNATIVES

A. ANAEROBIC DIGESTION

The anaerobic digestion process at this facility will be a high solids digestion process that will have an annual capacity of 5,000 dry tons. A combination of solids cake and liquid sludge producing feed solids of approximately 10 to 15% will be fed into the primary digester, a complete mix digester. The solids will be gently mixed for a retention time of approximately 10 to 12 days. After exiting the primary digester, the solids will be transferred to the dual purpose tank. Here the solids will remain up to 14 additional days prior to being discharged into a holding tank. While in the digester, the solids will be held at a temperature between 95°F and 98°F and gently mixed with a set of mixers and/or pumps. This will meet Class B PSRP requirements for land application. With the breakdown of the volatile solids during the process, raw biogas will be produced that will be used to generate biogas (equivalent to natural gas) and/or electricity.

When Class A material is generated the digester will be operated at a temperature between 122°F and 136.4°F for 14 to 1 day, respectively, for pathogen reduction.

1. Capacity – The digester will have dimensions of 60' in diameter with a depth of 40' for a 750,000 gallon working capacity. One additional tank with a working capacity of 230,000 gallons is in the process. This tank is a 230,000 gallon

feedstock equalization tank to assure acceptable % solids and to initiate digestion.

2. Detention time – The detention time for the digesters will be up to 30 days.

3. Pathogen reduction – For Class B for land application, pathogen control (PSRP) will be achieved by anaerobic digestion. For Class A EQ pathogen control will be achieved through thermal treatment for a required time.

4. Vector Attraction Reduction – Vector attraction reduction (VAR) requirements will be met using Option 1, whereby the mass of volatile solids in the solids shall be reduced by a minimum of 38 %. The volatile solids reduction will be measured by recording the solids entering the digester and those volatile solids remaining after the thermal treatment process. The loss in solids divided by the volatile solids going into the digester will result in the volatile solids reduction using the Van Kleeck equation.

5. Type of Cover – The dual purpose tank will have either a flexible cover, while the other tanks will have fixed covers.

6. Digester mixing mechanisms –Two mixing systems which employ either side wall mounted units or a top stirrer unit will be used.

7. Digester heating mechanisms – Boilers and/or heat exchangers (pulling waste heat from the generator) will be used to heat the digester.

8. Time and temperature record keeping – The anaerobic digestion process will have a process control system integrated into its technology.

B. OFF-SITE LOCATION

The ADS has the ability to divert the liquid, filtrate, and/or cake solids from the anaerobic digestion process and place the solids in trucks or water tight containers to be further processed elsewhere. The solids cake may be taken to an off-site location for further processing such as soil blending or disposed of at an approved landfill when necessary. OEPA will be notified of these operational changes in writing and the dry tons diverted will be documented.

IV. AGRONOMIC MANAGEMENT FOR BIOSOLIDS

A. Land Application

1. METALS : Maintained at or below the limits below:

Chemical Component	USEPA Ceiling in PPM	OEPA "Clean Sludge" in PPM
Arsenic	75	41
Cadmium	85	39
Copper	4,300	1,500
Lead	840	300
Mercury	57	17
Molybdenum	75	NA
Nickel	420	420
Selenium	100	100
Zinc	7,500	2,800
PCB	50	1

2. PATHOGEN CONTROL: The standard for pathogen control is Class B for farm application. Class B pathogen reduction requires that the geometric mean of the density of fecal coliform < 2,000,000 MPN/g. At this level the material is not considered to be infectious.

3. VECTOR ATTRACTION REDUCTION (VAR): Vectors are flies or other animals that can transport bacteria. Anaerobic digestion converts volatile solids into biogas. Volatile solids are the odorous part of organic materials. To meet VAR the anaerobic digestion process must reduce volatile solids by at least 38%. Our anaerobic digester exceeds this requirement.

4. LAND APPLICATION RESTRICTIONS: The minimum horizontal distance from the perimeter of the land application area must meet or exceed the values found in the following table.

Item	Min. Horizontal Separation Dist. In Feet Surface/Injection
Residence, Place of Business or Public Contact Area	300/100
Potable Water Well	300/100
Surface Water	33
Public Drinking Water Source	1,500
Medical Facility	1,000/300
Signs Posted 7 days prior to application	Field entry
Set-backs flagged prior to land application	

5. SITE MANAGEMENT REQUIREMENTS:

	HARVEST PERIOD				
Crops/Livestock/Public	30 Days	12 Months	14 Months	24 Months	38 Months
Food crops (touch surface)			X		
Food crops (below surface)					X
All other food crops, feed crops, and fiber crops	X				
Livestock grazing	X				
Turf or landscaping vegetation		X			
Potential public exposure		X			

A. All sludge handling and disposal will be done in accordance with the Federal Sludge Regulations 40 CFR 503 and Ohio EPA approved Sludge management plan.
B. All off- site storage will need to be approved by the Ohio EPA prior to use.
C. Loading rates will be controlled by the most restrictive of nutrient levels or metals.
D. Add a prohibition statement: Bio solids shall not be applied to snow covered ground, ice covered ground, or slopes greater than 12%. Run-off of biosolids from the application sites is strictly prohibited.
E. OEPA site authorization procedures that need to be followed.
F. Isolation table above defines isolation distances listed in the 503 guide.
G. A brief reference / discussion about storage / stockpiling sludge is above.
H. All records must be kept for a minimum of 5 years.
I. Signage requirements (per OAC 3745-40-11) will be maintained as shown in table above.
I. All sludge handling and disposal will be done in accordance with the Federal Sludge Regulations 40 CFR 503 and Ohio EPA approved Sludge management plan.
J. All off- site storage will need to be approved by the Ohio EPA prior to use.
K. Loading rates will be controlled by the most restrict of nutrient levels, metals, or agronomic rate based on N or P depending on soil data.
L. Biosolids shall be applied to snow covered ground, ice covered ground, or slopes greater than 12% per OAC 3745-40-08-D requirements and conditions. Run-off of biosolids from the application sites is strictly prohibited.
M. Only OEPA authorized sites will be utilized for land application of Class B biosolids. Site authorization requires submittal of completed BUA forms and soil data.
N. All records must be kept for a minimum of 5 years.

B. STORAGE

Biosolids that are discharged from the ADS and dewatered are placed into storage until the following parameters are met:

1. Laboratory analyses- Analysis work is performed on the biosolids for:

   a) Pollutant (metals) levels as defined in OAC 3745-40-04 table D-3.

   b) PCBs (<1 ppm)

   c) Fecal coliform for Class B (≤2,000,000 MPN /gram fecal coliform). For Class A ≤1,000 MPN/gram.

   d) At a minimum, volatile solids will be reduced by 38%

2. Storage of biosolids will occur at the ADS within tankage.

Annual production of biosolids will be approximately 5,000,000 to 7,000,000 gallons at start-up or some combination thereof, and the site capacity is as follows:

1. Covered storage area – None.
2. Open storage area – On-Site Lined Lagoon with 9,000,000 gallons capacity – biosolids will be stored as generated when field conditions don't allow access and shipped as generated when field access allows.
3. Off-Site Storage – Concrete and/or earthen lined lagoons will be utilized for storage on a seasonal basis. The lagoons will be isolated from surface and ground water and will be cleaned out regularly.

B. MARKETING COUNTIES

The prime counties to be targeted for marketing the biosolids are: the OEPA Southwest District counties. Biosolids may be sold or given away in the remaining Ohio counties but marketing will not be as aggressive due to the distance the material would have to be shipped making the cost of transportation prohibitive. Land application of Class B materials will also occur primarily in the above counties, but may also occur in the rest of the state. Distribution of Class A materials will also occur primarily in the above counties, but may also occur in the rest of the state.

C. DISTRIBUTION

The Class A and B biosolids will be distributed for sale as a product or in bulk for land application, respectively.

V. MONITORING AND REPORTING

A. MONITORING

The frequency of monitoring for pollutants, pathogen reduction and vector attraction reduction will be as follows:

Anaerobic digestion – The monitoring for the pollutants and bacterial counts will be monthly. The pathogen reduction requirement for temperatures will be recorded continuously whenever the pasteurization process is implemented. The vector attraction reduction requirement will be monitored per permit requirements for volatile solids entering and leaving the digestion system after pasteurization.

The frequency of monitoring for total Kjeldahl nitrogen or equivalent, ammonia nitrogen, phosphorus, potassium and pH will be monthly for both the anaerobic digestion processes.

The frequency of monitoring for the % dry solids, % volatile solids and the weight in dry tons shall be done monthly for the anaerobic digestion processes.

B. REPORTING

Annual reports will be generated and be available for five years and shall contain the following information:

1. Pollutant concentrations for all processes.

2. Description of how pathogen reduction requirements were met including the bacterial counts for all processes.

3. Description of how vector attraction reduction requirements were met for all processes.

4. Results for pathogen reduction, vector attraction reduction, total Kjeldahl nitrogen, ammonia nitrogen, phosphorus, potassium, pH, % dry solids, % volatile solids, and weight in dry tons processed. P and K data will be provided to farmers as P_2O_5 and K_2O, which are the fertilizer equivalents that farmers are accustomed to working with.

5. Signed certification statement for pathogen and vector attraction reduction compliance.

CHAPTER IV: PERSONNEL

The staff monitoring the facilities includes engineers with BS degrees or higher and specifically trained technical staff. The plant operators are specifically trained on plant operations and maintenance. Monitoring is conducted 24/7. Plant operations normally run 8 hours/day, five days per week, and 4 hours on Saturday. Plant staffing is determined by plant size and volumes managed, with a normal staffing or 1.5 operators per plant.

The facility permitting does not have specific licensed WWTP operator requirements, but we have a number of Class I, II, III, and IV operators on staff.

Staff is trained on Health & Safety, O & M, and other issues through regular meetings and operators interface weekly with a companywide conference call. The corporate H & S and O & M plans are attached to this document.

CHAPTER V: PROCESS CONTAOL AND LABORATORY TESTING

Sampling and analysis:

Through observation, one can see that a balance must be maintained to insure that the process described above is performed in an efficient manner.

The system can perform at full capacity if the methanogens are able to use the fermenting products constantly, but there is a fine line. If you feed too much to the system, rate of acid production can potentially overtake rate of it being consumed by methanogens.

We require that the chemical oxygen demand (COD) be taken every Monday, Wednesday and Friday. Testing for pH is also done on a MWF schedule; our digesters remain healthiest within a range of 7.4-8.0. Whereas our biomass tank prefers there to be a more acidic environment ranging from 5 to 7.0. In addition we do only require that the pH of our Biomass tank to be tested every Monday. Volatile fatty acids (VFA) and Total Inorganic Compound (TIC) are also tested as per the MWF schedule. The VFA/TIC ratio is used to suggest the required feeding rate into the digester. Preferably the ratio will range from 0.2-0.6, anything above or below these numbers would indicate that we are overfeeding or underfeeding the digester. If a digester were to ever indicate that it wasn't performing optimally or a decline in the overall health of the digester were in question; this testing would then be done on a daily basis.

Monthly quasar sends samples out to a third party lab to have them tested for trace metals. Arsenic, cadmium, chromium, copper, lead, mercury, molybdenum, nickel, selenium and zinc will be tested monthly.

Internal and external labs follow the necessary QA/QC for assuring quality control. Precision Analytical and Test America, the labs utilized follow standard QA/QC with blanks. The internal lab has established training and equipment calibration protocol in place for digester site testing and for the more complex ISCP MS, Buchi, GCs, and other lab equipment at our OARDC campus lab. The lab staff is trained and certified on the ICP MS by outside trainers.

CHAPTER VI: RECORDS

All facility records are kept on electronic file for a minimum of 5 years. When required by permit, paperwork copies are kept on-site as well.

Management of biosolids management records, including metals, VAR, pathogen reduction, land application sites, land application reports, eDMRs, NANIs, COC, etc. are generated by corporate and records are kept on site in binders. All regulatory permits are kept on site in binders as well.

CHAPTER VII: MAINTENANCE

All maintenance schedules are located online in our database of which we use across all of our plants. Each maintenance task is color coded with a legend supplied detailing which tasks are to be completed when. These tasks are broken down by that color coding into tasks, i.e., checking the pH, VFA/TIC and COD of effluent and/or feedstock (this is done every other day and that is specified on our reporting).

Operators will print off this exact checklist weekly to maintain a hardbound copy of these checklists on-site, for compliance purposes. Servicing the stone trap in the macerator is an example of a once a week task, coded differently for our operators to easily differentiate when this needs to be completed. We also have a database online of the procedures we use to inspect and properly maintenance all of our various plant components.

Fugitive emissions can be controlled during maintenance through two methods. When we isolate certain areas within the system the emissions have nowhere to escape, closing valves at either end creates an air tight seal. Any maintenance can also be put under negative pressure by opening valves in the direction of the receiving pit; these emissions are then pushed through a blower and into a biofilter.

We maintain negative pressure in both our receiving/loading operations and collection system as to minimize any amount of odors created when performing maintenance on our system. Any fugitive air is then returned into the receiving pit and blown through our biofilter, if for any reason the biofilter were to not function properly activated carbon is used as a back-up method of control.

BIOFILTER MAINTENANCE:

1. Moisture Control – Media has to be moist enough to sustain bacteria. Most notably in late summer we will have to add water and check regularly. The top two feet of the media should be inspected to a depth of two feet during drying periods. If the biofilter is dry enough for cracks to form that allow untreated air to escape it is too dry and should be watered.
2. Settling – Plant operators will mark the inside of biofilter media levels in order to observe settling (which will result in compaction and less voids for treatment over time). As settling occurs steps will be taken to rejuvenate the media by fluffing with a shovel, pitchfork, or rototiller.
3. Maintenance of components – Locate and assure accessibility to container discharge valves, inspect and maintain piping leading to and from the biofilters (especially after any spills get into the lines and/or back pressure is causing pressure relief valves to open), regularly inspect and maintain sumps/pits and blower fans.

4. Timing of maintenance – Biofilters are biological. It takes time for the microorganisms to establish on new media to control odors. Do not replace all the facility biofilters at once or odors will likely occur.

OUTPUT QUALITY:

The output from a functioning biofilter will be air that has a humus or soil odor. If sharp odors such as H2S or bad smells are present there is very likely short-circuiting occurring with the odorous air that has entered the biofilter. If this is noted go back to the Maintenance section and fluff or water the media. If this fails to control odor make sure we haven't added air sources that exceed biofilter capacity or it is time to replace the media.

CHAPTER VIII: SAFETY

In the event of a major spill; all operators are trained to react intelligently and quickly to first identify the source and halt its progress. Operators have been trained on how to read construction prints, and the P&ID's of each specific plant. Each plant has a specific set of details in the event of an emergency, detailing step by step what needs to be done. From first starting with halting the spill, containing the spill, cleaning up the spill and what to do for a final clean up. These plans list areas of responsibility who is to be informed, numbers to the DEC district in charge of the area and the DEC emergency spill numbers. Each site is stocked with all necessary supplies to handle such emergencies, in the event of an emergency plants are too be replenished the following day replacing supplies.

Attached is a copy of the contingency plan each employee is trained on.

SPILLS

In the unlikely event of a spill during transportation to or within the digester Dovetail Energy will take the following immediate actions:

1. HALT THE SOURCE OF THE SPILL.

2. CONTAIN SPILL; As appropriate, use straw bales to form a barrier.

3. CLEAN UP; Employ vacuum truck cleaning up large quantities of sludge.

4. FINAL CLEAN UP; As appropriate, flush roadways with water immediately after sludge is removed from the spill site, or sweep as necessary to clean. In the

event a spill occurs on private property, the owner will be contacted immediately and final cleanup will be completed to the satisfaction of the owner.

5. MANAGEMENT OF CLEAN UP EFFORTS; Dovetail Energy shall take immediate charge and initiate clean-up activities. Labor shall be secured as needed. Dovetail Energy shall also be on hand to communicate with the public or media on the scene, answering questions and advising of clean up activities.

6. NOTIFICATION:
   - Dispatch Manager to notify Operations Managers with exact location, time of occurrence, and conditions of spill.

   - **IMMEDIATE NOTIFICATION** will be given by Operations in the following order:
   - NYSDEC Office
     - Buffalo District Office 716.851.7165

   - Dispatch to notify R&M Manager about spill and needed equipment for clean-up.
   - R&M Manager to notify Managers if vacuum truck and/or personnel assistance is required.
   - Dispatch to obtain necessary information about spill such as police report and to follow-up as necessary to bill other parties for insurance claims.

7. SPILL PREVENTION; Dovetail Energy shall take the following steps:
   - Ensure truck drivers/press operator watch truck while loading at plant.
   - Ensure that tailgate seals are in place on trucks. If not, they will be replaced or repaired as necessary.
   - Inspect trucks daily and replace or repair as necessary.
   - Ensure tarps are in place while transporting.
   - Ensure unloading operations in the field are conducted so as to minimize any spillage.
   - Instruct truck drivers of assured safe distances to follow traffic so as to prevent sudden stops.

CHAPTER IX: ODOR PREVENTION MANAGEMENT

Per the attached Odor Management SOP we establish an odor prevention plan in two ways. First, by sizing all odor management equipment appropriately to manage odor created by incoming feedstock and from biogas. The CHPU and flare are sized to consume all biogas to create energy and/or to prevent biogas release. The biofilter is sized to treat air generated when pits are loaded under negative pressure. Second, we

self-monitor the twice daily at six established monitoring stations that encircle the facility. If odors are detected the plant operators make necessary changes to contain.

If odors are reported to the facility by the public or others we use a detailed odor report to detail operations and weather conditions at the time of the complaint. We go to the address, when provided, and investigate if we are the cause of an odor.

ODOR MANAGEMENT PLAN

I. Introduction

In the anaerobic digestion and biosolids industry, our neighbors are likely to have concerns and complaints regarding odor, noise, dust and/or material spilled by trucks.

It is our responsibility to be good neighbors by showing respect and understanding and taking their concern seriously. It is our duty to investigate all complaints immediately.

II. Procedure - During Business Hours

Following are the steps to be followed when dealing with our neighbors in regard to any type of complaint.

When the complainant calls in and identifies the reason for their call, follow these steps.

1. Ask them to hold while you get a member of the management staff to help them.

   Contact the front desk. The person there will follow the chain of command for responding to the call.

   Plant Manager
   First available manager
   Administrative Assistant at Main Office

2. While listening/talking to the complainant, be polite and understanding, remember that *your attitude should reflect the impression that "the customer is always right"*.

3. Always indicate that "We want to be a good neighbor" Ask the following questions:

   a. What time did you start noticing the odor/noise or... When did you first see the dust/spill?
   b. Do you presently detect the odor/noise/dust/spill? If yes,
      Would it be okay to visit you at your place now and meet with you?

c. If it was a spill, was it a commercial truck or a pick-up? Name on truck?
d. What is your full name; address and phone number?

4. Whether they allow you to meet with them or not, you must investigate the site of the complaint. When doing the site investigation, observe the following:

    a. Wind conditions
    b. Unusual activity on the grounds or neighboring grounds.
    c. Talk to adjacent neighbors if outside.
    d. Note if there is road construction detouring trucks to/from the facility through their neighborhood.
    e. Indicate any findings on the complaint form.

5. Complete the complaint form and pass it on to Operations for completion of the operational data.

6. Return completed form to front desk for typing and due process.

7. Notify Bruce Bailey, Regulatory of the complaint by e-mail and/or cell phone 216.538.1151.

III. Procedure - After Business Hours

Following are the steps to be followed after business hours.

When the complainant calls in and identifies the reason for their call, follow these steps.

1. Ask them to hold while you get a complaint form.

2. A. Complete the complainant's name and address.
   B. Advise them that the odor will be investigated immediately.
   C. Ask them if they would like a call back tonight or on the next business day.

3. Call Operations Manager. If you cannot contact him, call the manager on call and relay the necessary information.

4. The responding manager will drive to the area of the complaint and investigate the odor or spill.

5. After investigating the site of the complaint, the manager will go to the composting facility to document the status of the plant. This includes:

    A. Odor control system status
    B. Any open doors
    C. Material movement

Depending upon the time of the call, the person investigating the complaint will contact the resident and discuss the findings.

6. Document all findings on the complaint form. Forward a copy of the form to Bruce Bailey and Operations Management.

IV. Mitigate Source of Issues

ODOR: This facility is located in an isolated, rural setting and farm odors are a normal occurrence. However, some very localized odors will occur when the tank is actively mixed for land application. Due to isolation from neighbors there should not be impacts. Daily loading into the tank will be through existing pipes that deliver the inflow under the naturally occurring crust. The crust that forms reduces odor potential significantly.

NOISE: The facility is for storage of biosolids. It is isolated from neighbors. Noise will occur when trucks haul material to and from the tank and when a tractor is used to mix and unload the facility. Some noise occurs with land application activities. Seasonally activities will occur in ramped up activities as field access windows open and close. Care will be taken to operate during daylight hours as much as possible to minimize impacts. Equipment will have functioning mufflers in place.

SPILLS: Regular pro-active inspection of trucks and/or manure spreaders hauling biosolids from the facility and at field application sites will be conducted to assure that equipment is properly sealed. In the case that a spill occurs clean-up and notification to OEPA will occur per Spill Management Plan.

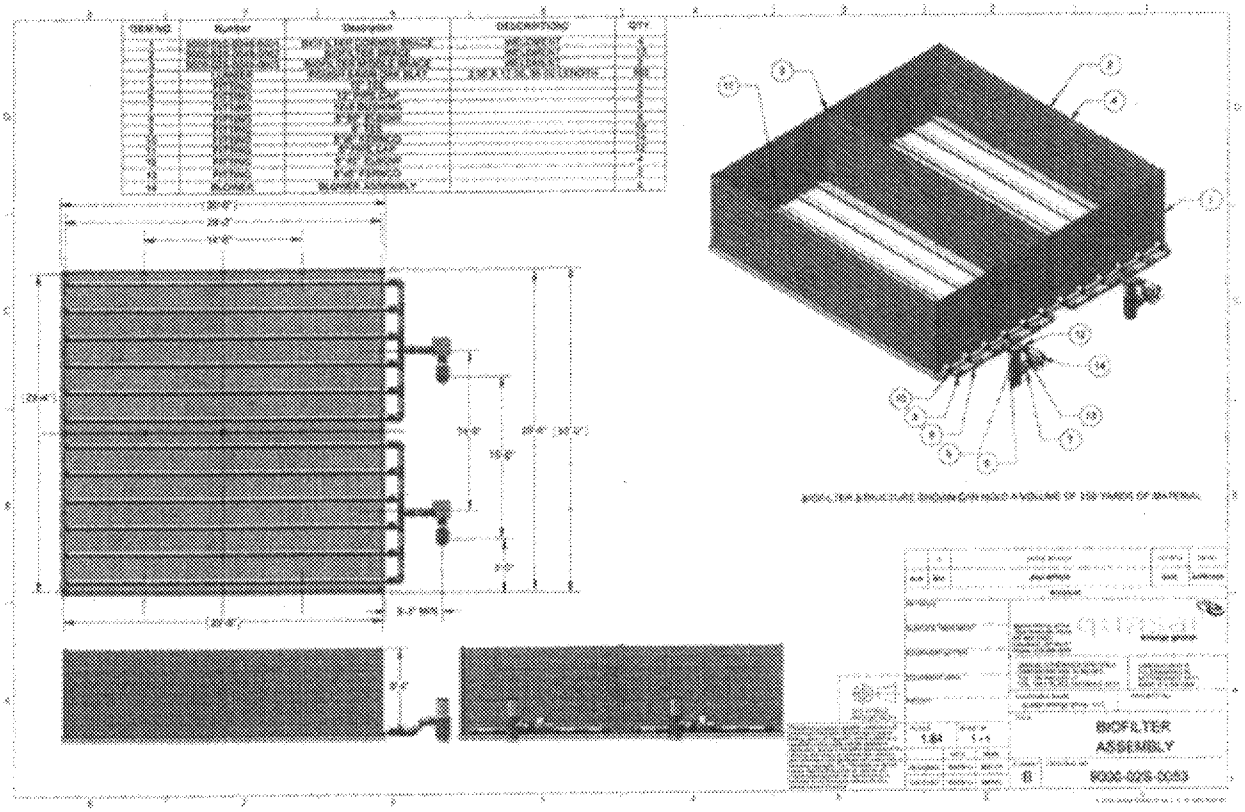
APPENDIX A

1. Plant detailed drawings

Detailed drawings are the basis of the facility. Copies of the drawings are kept on site and are available electronically. Qualified engineers train and support the facility operating staff on a daily basis and provide detailed binders on the instrumentation and hardware.

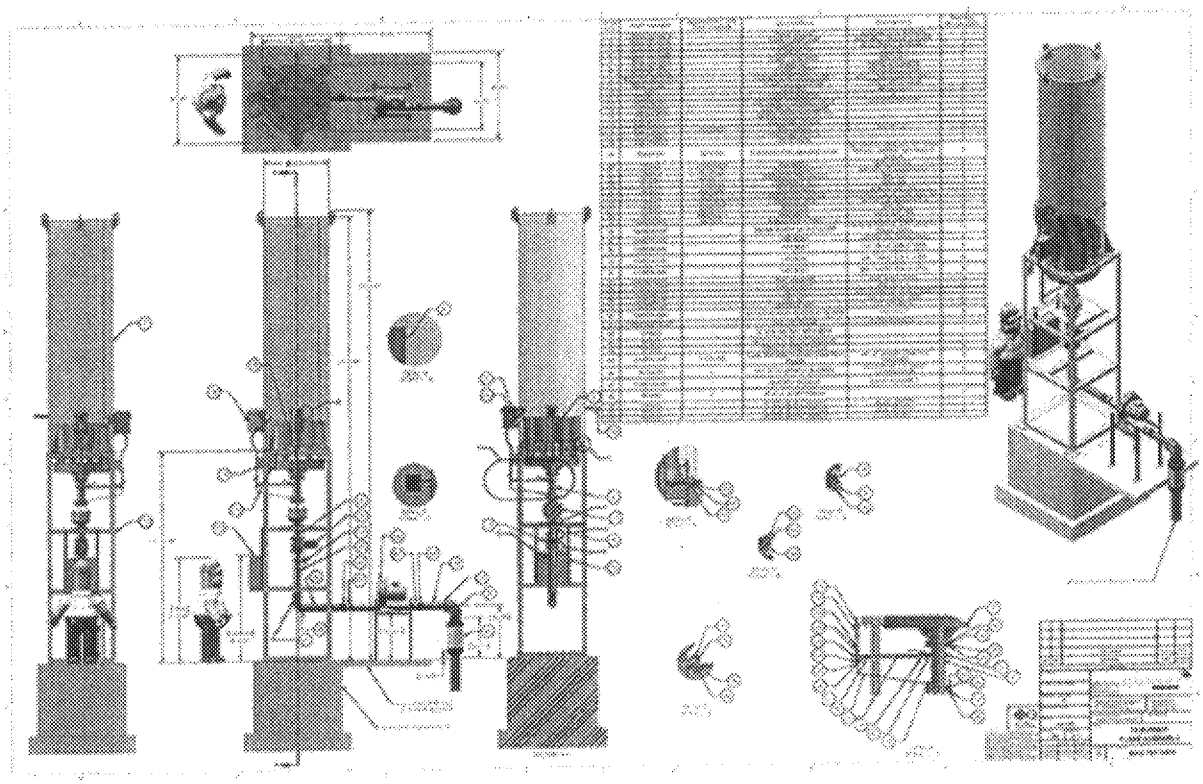
2. Biofilter

The 30'x30'x6' design will sit on a heated pad, with 4" of concrete used at the base covered with 6" of gravel and then covered in 30" of 1 part waste compost 1 part wood chips with a 2" bark mulch cover. Biofilter will be tested weekly in order to maintain a pH range of 7-8, moisture content within the biofilter will be kept between 50%-60%. Temperatures within the biofilter will be monitored daily using a 4' probe, to remain compliant with the temperature range of 77°-104°F. Please see attached maintenance log for daily recording purposes.



3. Flare

This flare will have a 7.5 horsepower blower motor controlling gas flow into the flare. Dovetail Energy will be using a 14 burner design which will help to reduce the amount of noise generated during flare operation. Monitoring instruments will be Type 1 general purpose sound meters, Type 2 or corresponding special sound level meters. Run timer will be placed on the flare and read through our PLC, to calculate the amount of biogas burned off by the flare. We will take the run time off of the PLC and the blower volume flow multiply those two amounts together and calculate the amount of biogas burned. Temperature of the flare when in operation will be recorded using a digital handheld infrared thermometer, and recorded every 15 minutes during operation as per requirements.



4. CHPU

The CHPU installed at Dovetail Energy will be a Caterpillar G3520B biogas generator. This generator has a maximum output of 1,600 kW; the output is directly related to the quality of feedstock received at the facility. Stack testing and analysis will be conducted annually to determine compliance with AERSCREEN/AERMOD models, testing for formaldehyde. Initial performance testing will be complete within the first year of operation to determine compliance with oxides of nitrogen (NO_x as NO_2), carbon monoxide (CO) and VOC's, subsequent testing will be done every 8,760 hours of operation or every 3 years, whichever occurs first. Control equipment on the exhaust will be installed if stack testing results determine a need for compliance. Stack testing protocols will be submitted to the department 45 days prior to a scheduled test. An emissions report shall be submitted within 60 days of conducting the stack test. Service and maintenance records will be filed digitally as well as hard bound copies to be left on-site.